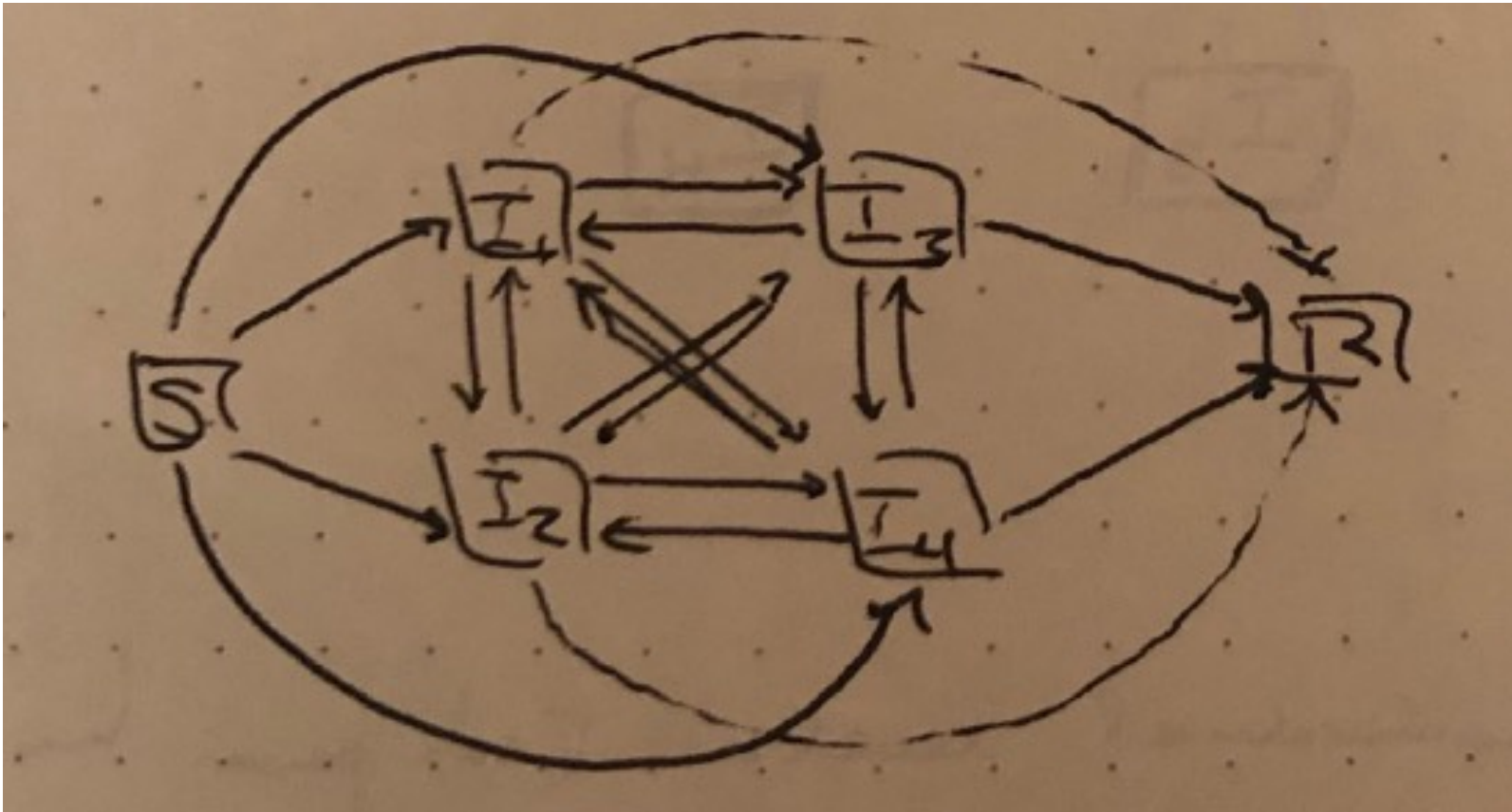


Key questions

- Will SARS-CoV-2 spread in the summer months?
- Will SARS-CoV-2 enter into long-term seasonal circulation?
- How would cross-immunity from the other coronaviruses affect the pandemic?
- If we can't answer these questions now – what information do we need?

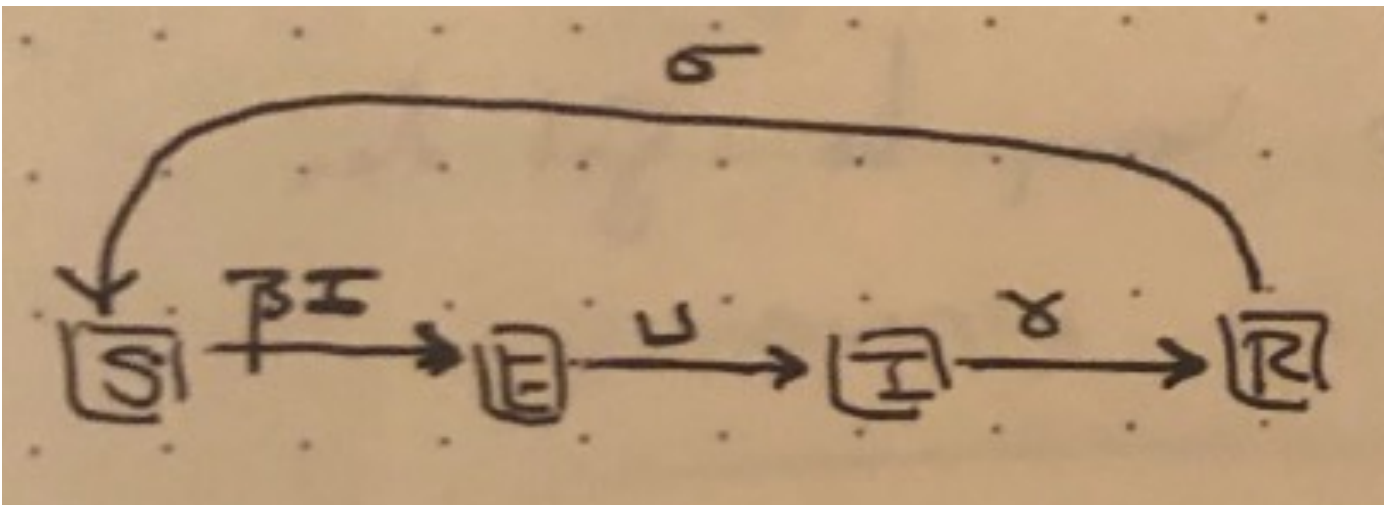
Early models

Multiple strains



(a bad model)

One strain with seasonality and waning immunity



(a better model, but not enough detail)

$$\begin{aligned}\frac{dS}{dt} &= -\beta(t) SI + \sigma R \\ \frac{dE}{dt} &= \beta(t) SI - \nu E \\ \frac{dI}{dt} &= \nu E - \gamma I \\ \frac{dR}{dt} &= \gamma I - \sigma R\end{aligned}$$

